

Circle Coordinate Geometry 2

1.

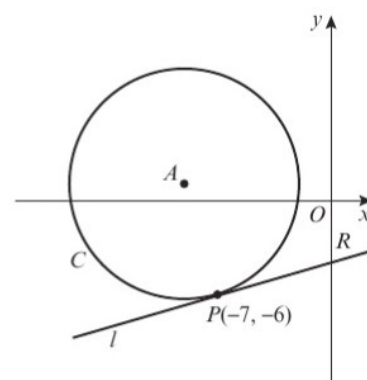
The point $P(1, -2)$ lies on the circle centre $(4, 6)$.

- Find the equation of the circle.
- Find the equation of the tangent to the circle at P .

2.

The circle C has equation $x^2 + 18x + y^2 - 2y + 29 = 0$.

- Verify the point $P(-7, -6)$ lies on C . **(2 marks)**
- Find an equation for the tangent to C at the point P , giving your answer in the form $y = mx + b$. **(4 marks)**



- Find the coordinates of R , the point of intersection of the tangent and the y -axis. **(2 marks)**
- Find the area of the triangle APR . **(2 marks)**

3.

The tangent to the circle $(x + 4)^2 + (y - 1)^2 = 242$ at $(7, -10)$ meets the y -axis at S and the x -axis at T .

- Find the coordinates of S and T . **(5 marks)**
- Hence, find the area of $\triangle OST$, where O is the origin. **(3 marks)**

4.

The circle C has centre $P(11, -5)$ and passes through the point $Q(5, 3)$.

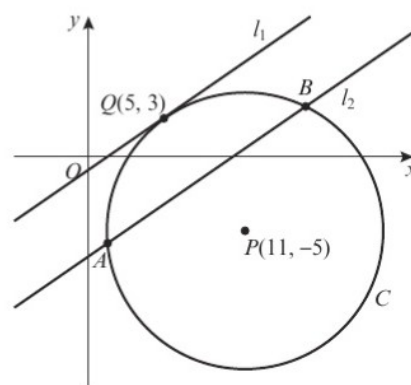
- Find an equation for C . **(3 marks)**

The line l_1 is a tangent to C at the point Q .

- Find an equation for l_1 . **(4 marks)**

The line l_2 is parallel to l_1 and passes through the midpoint of PQ . Given that l_2 intersects C at A and B

- find the coordinates of points A and B **(4 marks)**
- find the length of the line segment AB , leaving your answer in its simplest surd form. **(3 marks)**



5.

The points A and B with coordinates $(-1, -9)$ and $(7, -5)$ lie on the circle C with equation $(x - 1)^2 + (y + 3)^2 = 40$.

- Find the equation of the perpendicular bisector of the line segment AB .
- Show that the perpendicular bisector of AB passes through the centre of the circle C .

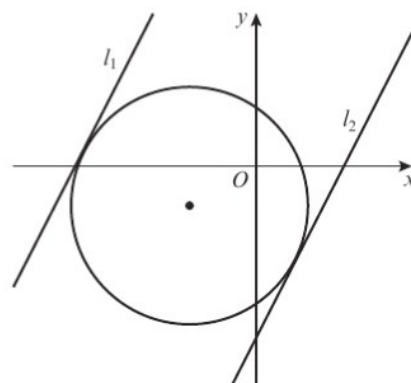
6.

The circle C has equation $(x + 5)^2 + (y + 3)^2 = 80$.

The line l is a tangent to the circle and has gradient 2.

Find two possible equations for l giving your answers in the form $y = mx + c$.

(8 marks)



7.

The circle C has equation $x^2 - 4x + y^2 - 6y = 7$.

The line l with equation $x - 3y + 17 = 0$ intersects the circle at the points P and Q .

a Find the coordinates of the point P and the point Q .

(4 marks)

b Find the equation of the tangent at the point P and the point Q .

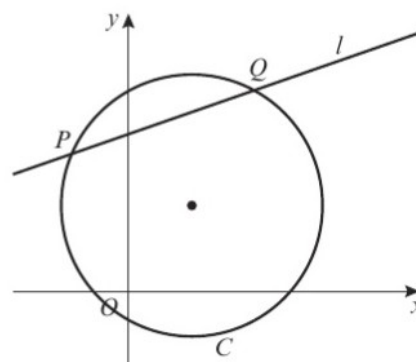
(4 marks)

c Find the equation of the perpendicular bisector of the chord PQ .

(3 marks)

d Show that the two tangents and the perpendicular bisector intersect at a single point and find the coordinates of the point of intersection.

(2 marks)



8.

The points $U(-2, 8)$, $V(7, 7)$ and $W(-3, -1)$ lie on a circle.

a Show that triangle UVW has a right angle.

b Find the coordinates of the centre of the circle.

c Write down an equation for the circle.

9.

The points $A(-3, 19)$, $B(9, 11)$ and $C(-15, 1)$ lie on the circumference of a circle.

a Find the equation of the perpendicular bisector of

i AB **ii** AC

b Find the coordinates of the centre of the circle.

c Write down an equation for the circle.

10.

The points $A(-1, 9)$, $B(6, 10)$, $C(7, 3)$ and $D(0, 2)$ lie on a circle.

a Show that $ABCD$ is a square.

b Find the area of $ABCD$.

c Find the centre of the circle.